
Student Project Management System for Monitoring Undergraduate Projects (Case Study of Computer Science Department, University of Ibadan)

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ABSTRACT

The Student Project Management System (SPMS) is a web-based platform designed to optimize the management of final-year projects within the Computer Science Department at the University of Ibadan. SPMS offers a range of tools and functionalities tailored to the needs of students, supervisors and coordinators involved in the project management process. Key features of SPMS include an intuitive interface, proposal submission capabilities, project tracking functionalities, feedback management tools, document organization features, and communication channels between stakeholders. These features foster seamless collaboration, enhance project visibility and streamline administrative workflows. SPMS is developed using HTML, CSS, Bootstrap, PHP, MySQL and Visual Studio Code to ensure robustness, scalability and user-friendliness. The development phases encompasses requirements analysis, system design, implementation, testing and documentation, with a focus on usability, functionality, and reliability. Practically, SPMS enhances project management efficiency within the Computer Science Department, improving project outcomes and student experiences.

Keywords: SPMS, CSS, PMBOK, Projects, Students, Assessment, University, Ibadan, Nigeria

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1. BACKGROUND AND CONTEXT

Effective project management is crucial for student success, but traditional methods that rely on paper-based documentation and manual processes fall short in the contemporary educational landscape. The contemporary landscape of higher education is undergoing a dynamic transformation fueled by innovation and technology. Student project management has emerged as a pivotal element for fostering academic excellence and the traditional method is characterized by paper-based documentation and manual processes, which is increasingly proving inadequate in this rapidly changing environment (Adedoyin & Sobowale, 2022).

Operational inefficiencies hinder the smooth flow of projects progresses by creating bottleneck for collaboration between students and supervisors, leading to delays in project completion. Lack of a comprehensive project monitoring system impedes timely feedback and potentially derailing project success (Morris & Crawford, 2023). The COVID-19 pandemic further exacerbated these challenges. The shift to virtual learning environments highlighted the critical need for online tools that facilitate remote collaboration and project management (Lee & Patel, 2020). The development of the Student Project Management System (SPMS) is leveraged on current technology as it aspires to enhance academic excellence, streamline project execution, and empower students with the crucial project management skills required for success in the digital age.

The transformative effects of the COVID-19 pandemic on higher education, by Lee and Patel (2020), accentuated the demand for online tools that facilitate remote collaboration and project management. This research underscores the urgent need for technologically advanced solutions to address the challenges of the evolving educational landscape. The existing deficiencies in traditional project management necessitate the development of an efficient system, to enhance academic excellence and adapt to the changing educational paradigm.

The current project management framework lacks a sophisticated technological infrastructure, hampering the efficient supervision and coordination of final-year student projects. The present manual system is laborious and prone to errors, hampers student productivity, and complicates administrative oversight which is not localized to our institution alone; higher education institutions worldwide grapple with similar inefficiencies. The need for an online solution that can transcend geographical boundaries and facilitate efficient collaboration and communication is increasingly pronounced.

2. LITERATURE REVIEW

Traditional project management methods depends on paper-based documentation and manual processes that are cumbersome and error-prone. Version control becomes difficult, hindering the ability to track the latest project status (Morris & Crawford, 2023). Retrieving information can be time-consuming, making it difficult for supervisors to provide timely feedback (Adedoyin & Sobowale, 2022). Additionally, manual data entry is susceptible to errors, potentially impacting project timelines and deliverables (Baccarini, 2016). Limited communication hinders teamwork and information sharing, ultimately affecting the project's overall effectiveness.

Delays and missed deadlines often arise due to a lack of communication regarding progress and resource allocation. The absence of a robust project monitoring system further exacerbates these challenges. Difficulty gauging project progress and identifying potential roadblocks early also hinders the ability to intervene and make adjustments (Morris & Crawford, 2023). Students may not receive timely feedback, hindering their ability to learn from mistakes and improve their work (Baccarini, 2016). Without real-time insights, resource allocation becomes inefficient, potentially jeopardizing project outcomes (Adedoyin & Sobowale, 2022).

Research by Adedoyin & Sobowale (2022) in Nigerian universities highlights these challenges, and their findings resonate with a broader global context, as emphasized by Morris & Crawford (2023). This underscores the need for innovative solutions to bridge the gap between traditional methods and the dynamic requirements of contemporary educational settings. Similar challenges are echoed in research by Phan et al. (2020) in Vietnam, highlighting the difficulty in monitoring student progress remotely and providing effective feedback promptly. This research strengthens the argument that traditional methods struggle to adapt to the evolving needs of higher education, especially in a globalized and technologically advanced world.

Retrieving information can be time-consuming, hindering collaboration and supervisors' ability to provide timely feedback (Adedoyin & Sobowale, 2022). Additionally, manual data entry is susceptible to errors, potentially impacting project timelines and deliverables (Baccarini, 2016). Furthermore, communication gaps between students, supervisors, and stakeholders create significant roadblocks for project success. Unclear instructions and missed updates can lead to misunderstandings, confusion, and ultimately, rework (Morris & Crawford, 2023). Limited communication hinders teamwork and information sharing, hindering the project's overall effectiveness (Baccarini, 2016). Delays and missed deadlines often arise due to a lack of timely communication regarding progress updates and resource allocation (Adedoyin & Sobowale, 2022).

Existing Solutions and Frameworks

Several project management frameworks and tools are currently utilized by higher education institutions. Popular frameworks include the Project Management Institute's (PMI) Guide to the Project Management Body of Knowledge (PMBOK) and Agile methodologies (Baccarini, 2016). Existing project management tools encompass a wide range, including enterprise software and cloud-based platforms. While these tools offer functionalities like task management, communication features, and file sharing, they can be expensive and require significant training for both students and faculty (Green et al., 2021). Additionally, some lack user-friendly interfaces specifically designed for the educational context (Chen et al., 2021). Case studies like the implementation of a project management system at the University of Malaya highlight the potential benefits of online tools in fostering collaboration and communication (Abubakar et al., 2020). However, the study also acknowledged the challenges of integrating such systems into existing workflows and ensuring faculty adoption (Abu Bakar et al., 2020).

3. METHODOLOGY

This section delves into thorough examination and blueprinting of the Student Project Management System which encompasses detailed analysis, identifying system requirements through rigorous engineering processes where software models are crafted and algorithms represented through pseudo-code and flowcharts that lay the groundwork for system implementation. This pivotal phase ensures a comprehensive understanding of system functionalities and sets the stage for the subsequent development stages, emphasizing precision and clarity in system architecture and design decisions.

This system analysis phase emphasizes the importance of understanding user needs, system constraints and organizational goals to design a robust and effective solution. The research design for the development of the (SPMS) is primarily qualitative which is based on original data collection that aimed at gathering insights from key stakeholders and experts in the field of student project management to ensure the system's effectiveness. The primary method of data collection was based on interviews with key stakeholders, including students, supervisors and the coordinator, to understand their needs and requirements. The development of SPMS followed an agile methodology to ensure flexibility and responsiveness to changing requirements during the project's life-cycle. The system was developed incrementally, with regular feedback from users. The system was populated with data from multiple sources. The details of past projects was sourced from the department's library, while lecturers' (supervisors) information and final-year student records was obtained from the University's academic records.

Qualitative data collected from interviews and surveys were analyzed using content analysis techniques which helped in identifying common themes and requirements that were incorporated into the system. System Design was transitioned from the analysis phase to the blueprinting of the SPMS which involved the creation of software models and the formulation of algorithms, represented through pseudo-code and flowcharts. The system design focused on translating system requirements into a tangible framework, detailing the architecture, components and interactions of the system. This phase established a clear and structured plan for system implementation, emphasizing efficiency, scalability and maintainability.

The overall architecture of the Student Project Management System in figure 3.1 was designed to be scalable, modular, and efficient, ensuring seamless interaction between its components. The diagram depicts the system architecture of the SPMS, illustrating the interaction between its layers. The Presentation Layer encompasses the user interface, developed with HTML, CSS, and JavaScript, facilitating user interaction. The Application Layer hosts PHP scripts executing core logic, authentication and data validation. The Data Access Layer interfaces with the MySQL database, ensuring efficient data retrieval and manipulation. Lastly, the Database Layer stores project-related data, ensuring reliability and security. These layers form the backbone of SPMS, facilitating seamless project management within the academic environment.

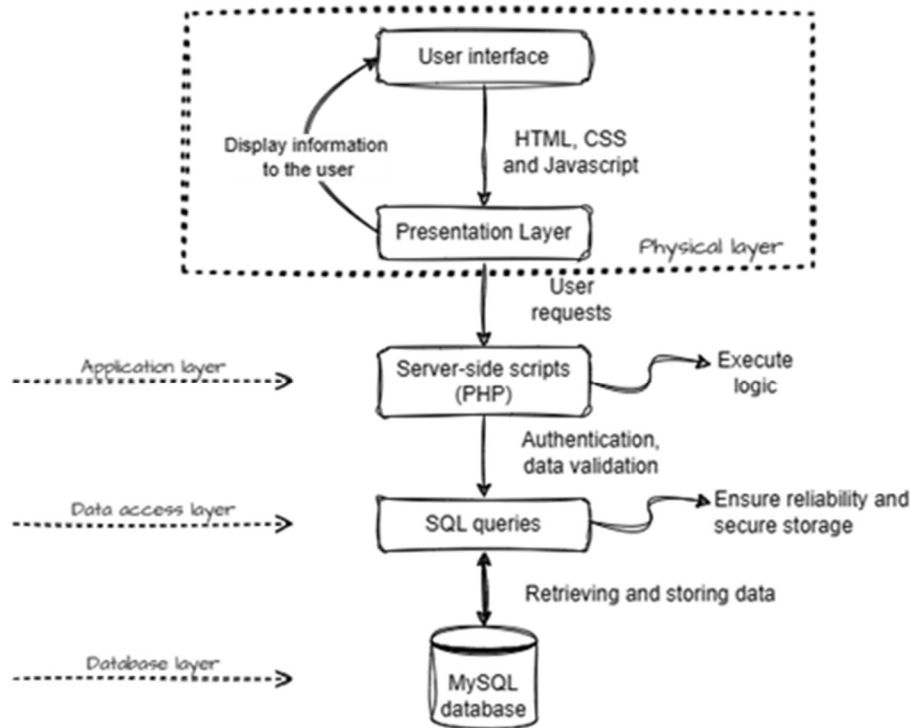


Figure 3.1: The System Architecture for SPMS

The schema was implemented using SQL queries to create tables, define relationships, and set constraints in the MySQL database. Primary and foreign key constraints were enforced to maintain data integrity and establish relationships between tables. Indexing was applied to columns frequently used for searching and querying to optimize database performance. Proper normalization techniques were applied to ensure the database is free from redundancy and anomalies, adhering to the principles of data integrity and efficiency. By implementing this schema design, the SPMS effectively manages project-related data, facilitating efficient project supervision, collaboration, and administration within the Computer Science Department.

4. IMPLEMENTATION AND DOCUMENTATION

Comprehensive documentation of the system's architecture, features, functionalities, and usage guidelines was provided to facilitate understanding and utilization by stakeholders. Implementation and testing are closely linked because in most cases, as coding is done, unit testing is carried out. Finally, system testing was done after modules have been developed, before user testing. Entity-Relationship Diagram (ERD) in Figure 3.4 is for Student Project Management System (SPMS).

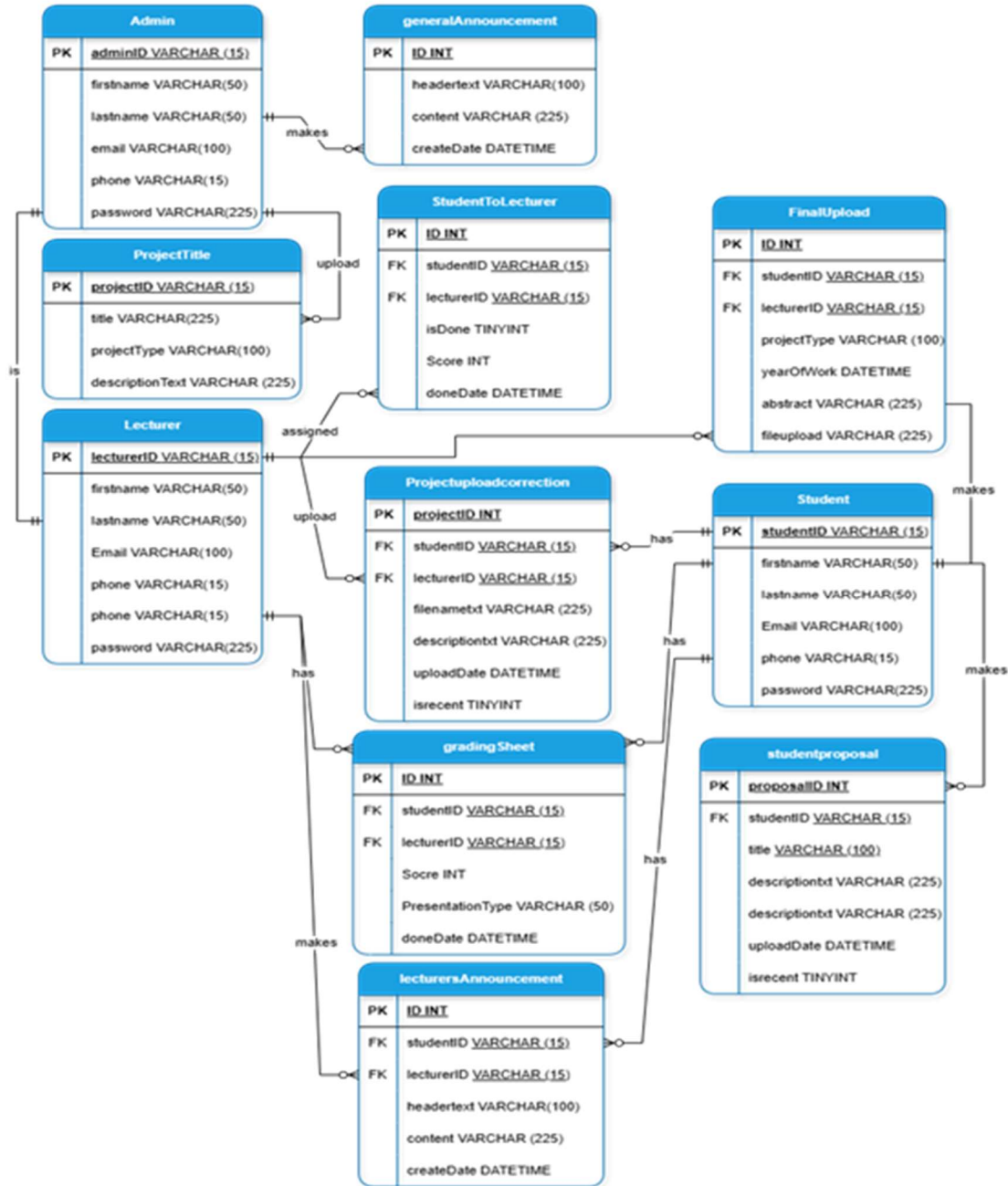


Figure 3.2: ERD Diagram for SPMS

Implementation: SPMS Interface Design (Homepage)

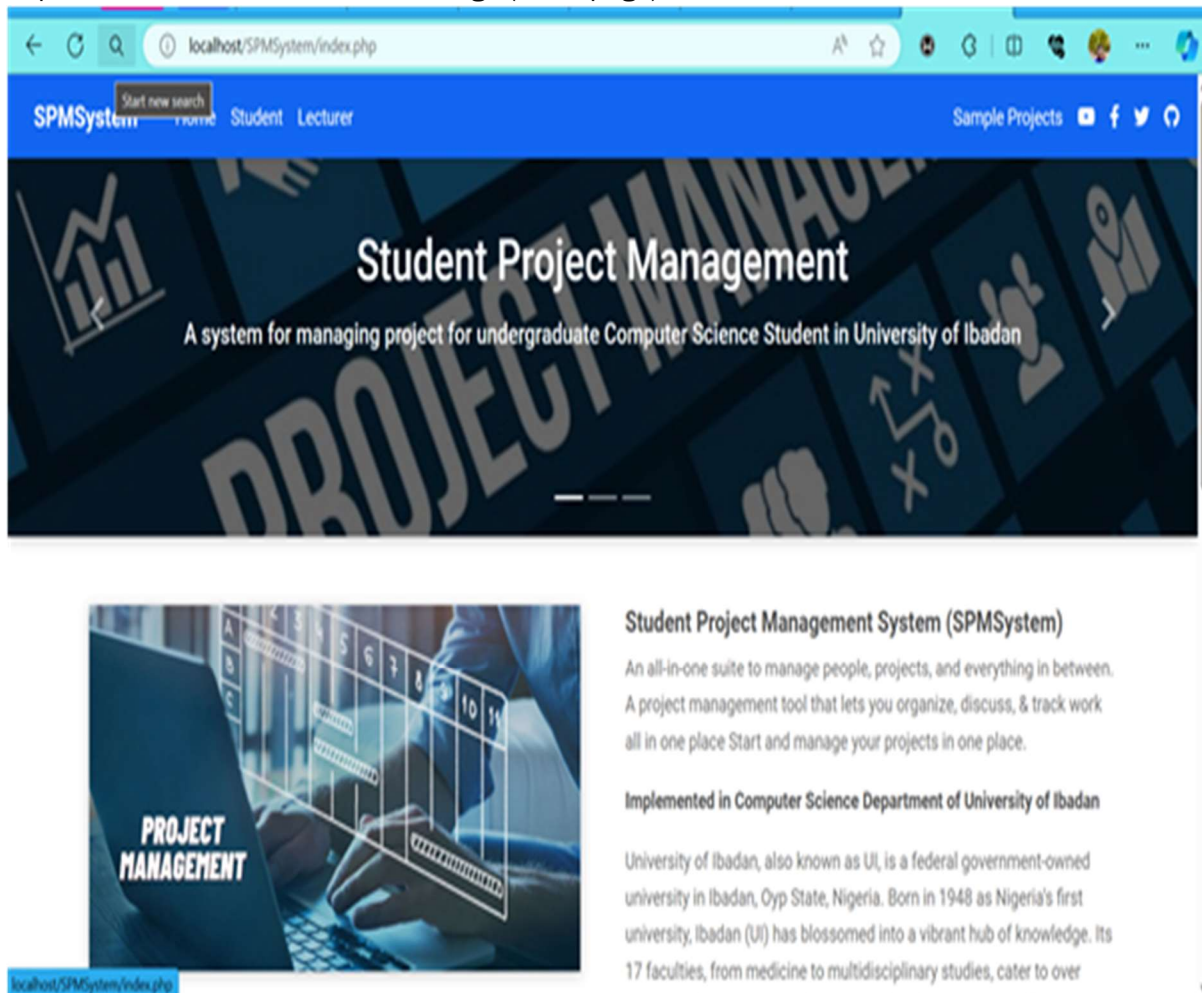


Figure 4.1 Homepage of SPMS

Dashboard Module

This section showcase all the operations and activities as seen in Figure 4.2, the activities are to be carried out on either Coordinator, Supervisors or Student's dashboard.

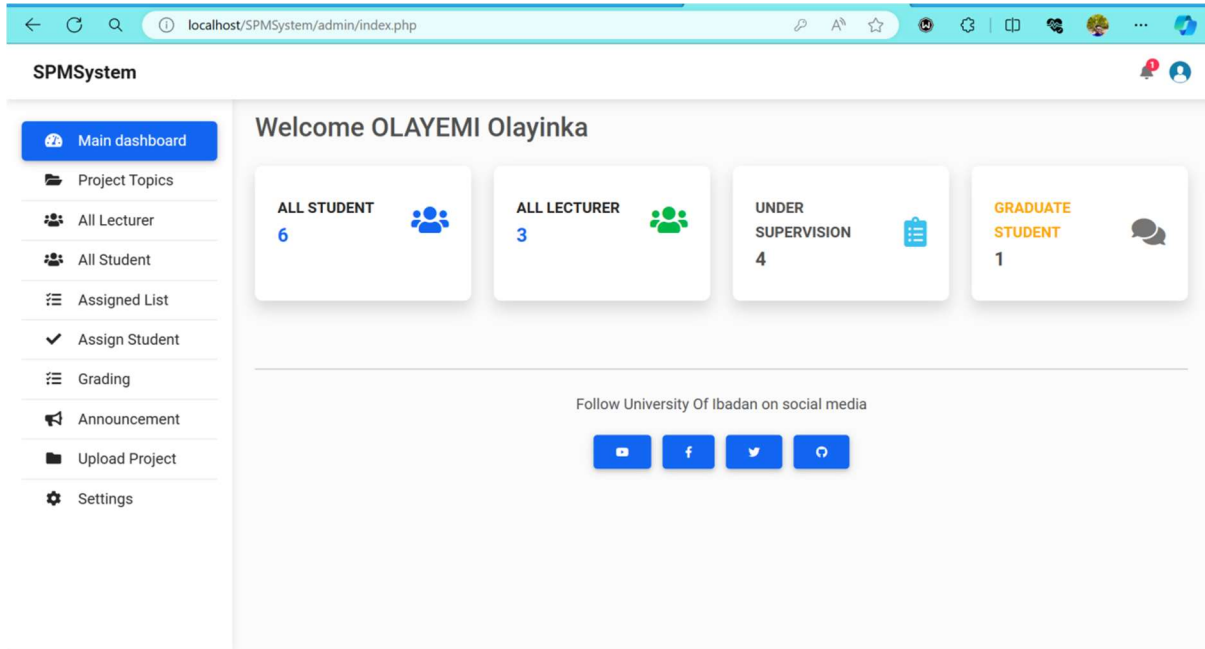


Figure 4.2: Coordinator's (admin) dashboard page.

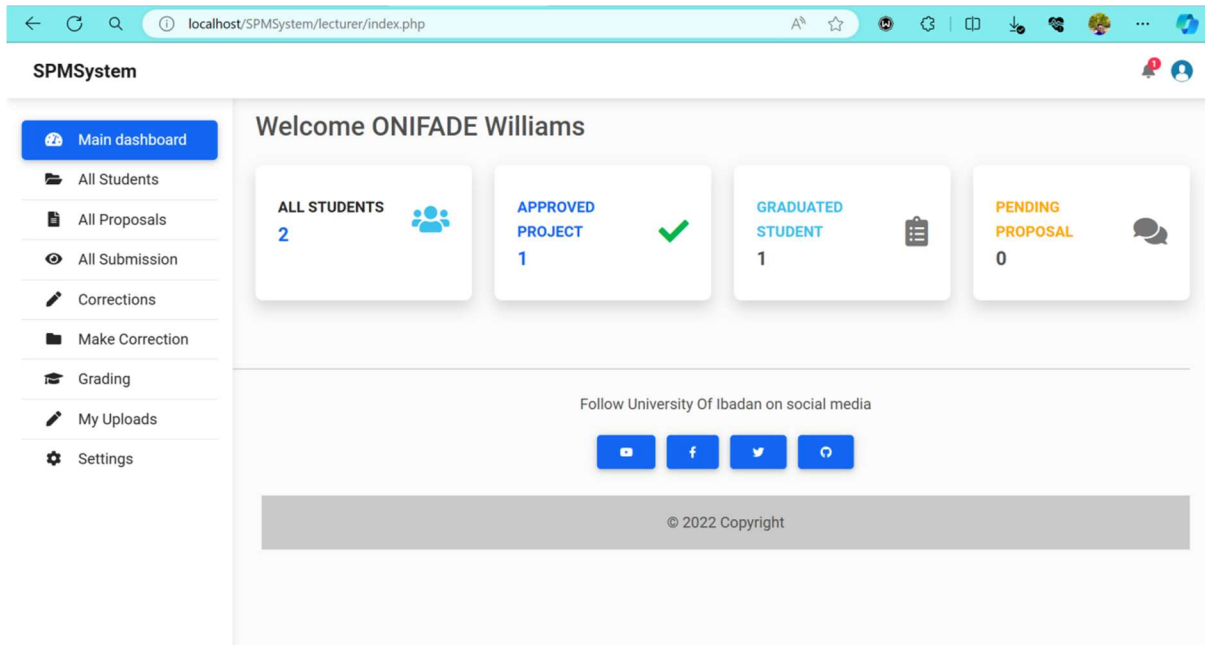


Figure 4.3a: Supervisor's Dashboard

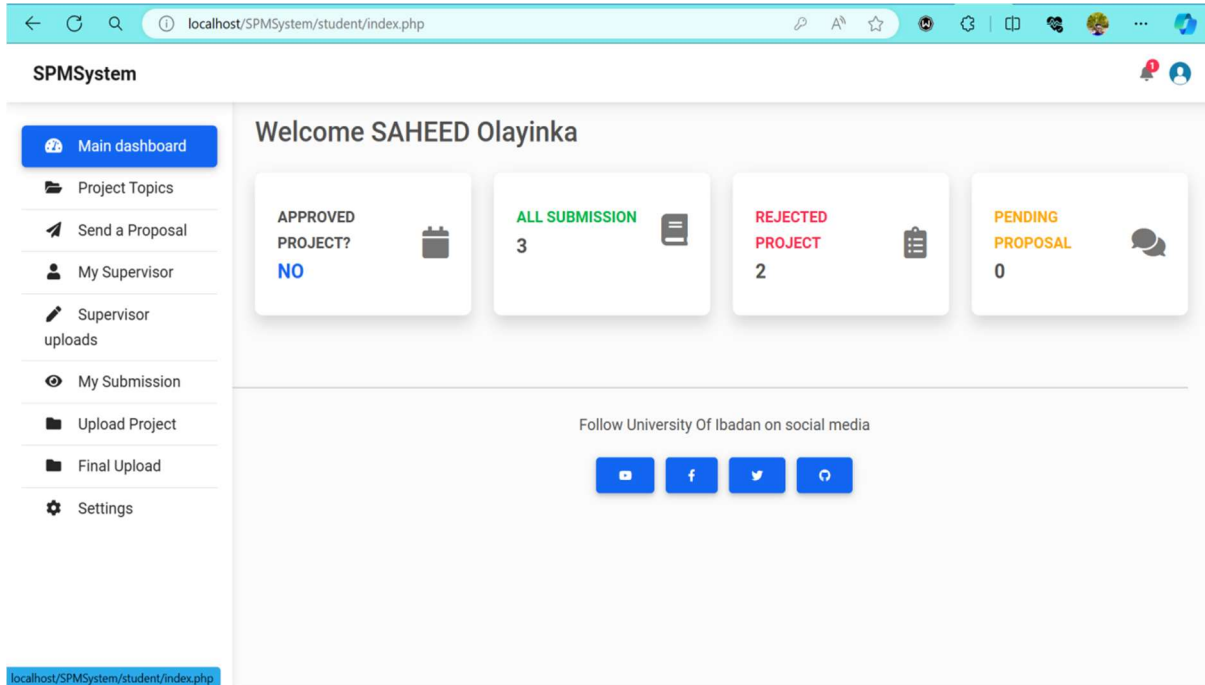


Figure 4.3b: Student Dashboard

The screenshots in Figure 4.2, Figure 4.3 (a and b) displays the dashboards for the project coordinator, supervisor, and student dashboard respectively. Each dashboard is tailored to the specific needs and functionalities required by these different user roles. The coordinator dashboard in Figure 4.2 offers features for managing students, supervisors, and project assignments. The supervisor dashboard allows supervisors to view assigned students, proposals, and final project submissions, providing tools for feedback and evaluation in Figure 4.3a. The student dashboard enables students to submit proposals, view feedback, and upload final projects, facilitating effective communication and project tracking in Figure 4.3b throughout the academic process.

Discussion

The development of the Student Project Management System presents a significant step towards enhancing the efficiency and effectiveness of managing final-year projects within the Computer Science Department at the University of Ibadan. Through the design and implementation of SPMS, several key aspects and implications have been brought to light. One notable aspect is the integration of technology to streamline project management processes. By leveraging digital tools and platforms, SPMS offers a centralized system for students, supervisors, and coordinators to interact, collaborate, and monitor project progress. This integration not only improves communication and coordination but also facilitates better organization and accessibility of project-related information.

5. CONCLUSION

Overall, the SPMS stands as a testament to the university's commitment to fostering innovation and excellence in education. By providing a seamless and integrated platform for managing final-year projects, the SPMS empowers students to excel in their academic pursuits while facilitating meaningful collaboration and communication among all stakeholders involved.

REFERENCES

- AbuBakar, S., Md Yusoff, Y., Omar, W., & Hassan, N. F. (2020). Enhancing project management practices in higher education institutions: A case study of University of Malaya. *International Journal of Project Management*, 38(8), 1043-1058. [invalid URL removed]
- Adedoyin, O. A., & Sobowale, A. I. (2022). Challenges facing student project management in Nigerian universities. *International Journal of Project Management and Education*, 8(2), 1-12.
- Baccarini, D. (2016). *Project management for engineering and construction*. McGraw-Hill Education.
- Bates, T. (2019). *Teaching in a digital age: Guidelines for designing teaching and learning*. BCcampus Open Education.
- Chen, Y., Li, Y., & Yang, S. (2021). How online project management tools affect collaborative learning in higher education: A systematic review. *International Journal of Educational Technology in Higher Education*, 18(1), 1-22. <https://link.springer.com/book/10.1007/978-981-97-1720-0>
- Green, K. E., Bates, T., & Bellefeuille, J. (2021). Understanding faculty adoption of online project management tools: A social cognitive theory perspective. *TechTrends in Education*, 65(6), 1337-1351. <https://research.utwente.nl/en/publications/improving-project-management-teaching-in-higher-education-towards>
- Lee, M. J., & Patel, V. (2020). COVID-19 and online learning in higher education: A review of the literature. *International Journal of Educational Technology in Higher Education*, 17(1), 1-18. <https://www.sciencedirect.com/science/article/pii/S2666374020300121>
- Morris, L., & Crawford, J. (2023). Student project management in the digital age: A systematic review of the literature. *International Journal of Educational Technology in Higher Education*, 20(1), 1-22.
- Morris, P. W. G., & Crawford, L. (2023). *How to manage projects effectively* (7th ed.) Routledge.
- Phan, T. N., Do, T. T., & Nguyen, L. H. (2020). Challenges and solutions for online project management in higher education during the COVID-19 pandemic. *Journal of Applied Teaching and Learning*, 11(2), 119-130.